

CIA/OBGI/PN62.2639-72

**CONFIDENTIAL--TERRAIN AND CLIMATE AT THE SOUTHERN SHORE OF THE
CASPIAN SEA**

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Terrain and Climate at the Southern
Shore of the Caspian Sea

The narrow, flat plain that lies between the Caspian Sea and the foothills of the Elburz Mountains varies in width from approximately 20 miles near Behshahr ($36^{\circ}43'N$, $53^{\circ}34'E$) to less than 5 miles near Bandar-e Gaz ($35^{\circ}47'N$, $55^{\circ}59'E$). Within a few miles of the coast, elevations range from approximately 80 feet below sea level on the plain to several hundred feet above sea level in the Elburz foothills. (The surface of the Caspian Sea is approximately 90 feet below sea level.) The nearby Elburz Mountains rise to 5000 feet above sea level within 10 to 20 miles of the Caspian and to more than 10,000 feet 25 to 30 miles south of the coast.

A shallow bay, the Khalij-e Gorgan, borders the plain on the northeast. The bay, approximately 25 miles long and six miles wide, is nearly enclosed by the Lian-Kaleh Peninsula, a sandbar about one mile wide and 20 miles long. The peninsula has an elevation of approximately 10 feet above the level of the Caspian and consists mainly of sand dunes covered with scrub and reeds; it is believed to be uncultivated and uninhabited. The level of the Caspian has dropped about 8 feet since 1929 and the Khalij-e Gorgan is gradually being filled in by surrounding marshes.

The plain is crossed by several large, steep-sided perennial streams and numerous smaller ones. The Neka Rudkhaneh-ye, the largest river in the study area, flows westward until it reaches the village of Neka where the river turns northward to enter the sea. The smaller streams which cross the plain and enter Khalij-e Gorgan from the south are all less than 10 miles long.

The Caspian plain is one of the country's main agricultural areas; paddy rice is the dominant crop but some barley, cotton, and possibly wheat are raised on the higher ground. Deciduous and citrus fruit orchards and winter and early spring vegetable gardens are located near the settlements. In the uncultivated areas the natural vegetation consists of shrubs and grasses with trees along the water courses. The foothills and the northern Elburz slopes have

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large forests of mixed hardwoods with some stands of beeches and oaks. These forests are generally at and above the 1000 foot contour level.

This portion of the plain is included in the Mazandaran Ostan or province which has its capital at Sari. According to the 1966 census, the ostan has a population density of approximately 100 people per square mile. Approximately 75 percent of the ostan's population is rural. Most of the people live in the numerous small villages that lie in the plain and along the base of the foothills.

The only asphalted road in the area crosses the plain along the base of the foothills linking Gorgan, Bandar Shah, Behshahr, Sari, and other towns to Teheran. Scattered rural settlements are connected by a sparse network of earth or gravel roads. Most maps show an unimproved track running along the coast from Babol Sar to the eastern tip of the Lian Kaled Peninsula, but its present condition is not known: it is probably passable in dry weather. A railroad line (4' 8 1/2" standard gauge) runs from Teheran across the plain to Gorgan. This is a branch of a main line that connects Teheran to Meshed.

Cross-country movement generally would be easy on the plain except in some cultivated areas, where shallow irrigation ditches restrict movement. Streams are flooded occasionally during March and April, when waters from melting snow and the rainy season combine, and during the heavier rains of October and November, but are shallow and fordable most of the remainder of the year.

The Caspian plain has cloudy, wet winters and hot, steamy summers and high relative humidity throughout the year. Summer temperatures rise to the 80's and 90's during the day and drop to the 70's at night; the winters are mild with daily highs in the 50's and lows in the 40's. Summer temperatures in combination with high relative humidities are very oppressive. The area receives approximately 30 inches of annual rainfall, most of which falls from October through March. Showery, cloudy periods occur in the summer however, and at least 1 inch of rainfall can be expected every month in the year. Snowfall is rare. Dew is heavy from March to September. Along the coast, it is generally calm in the mornings but in the evenings light onshore breezes develop. (See Appendix A, Tables 1 through 4 for detailed climatic data.)

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APPENDIX A

Detailed Climatic Tables for Babol Sar and Gorgan, Iran

Table 1. Temperatures:

- A. Mean Daily Minimum Temperature (°F).
- B. Mean Daily Maximum Temperature (°F).
- C. Absolute Minimum Temperature (°F).
- D. Mean Number of Days with Minimum Temperatures $< 32^{\circ}\text{F}$ or Lower.
- E. Absolute Maximum Temperature (°F).

Table 2. Precipitation:

- A. Mean Precipitation (Inches).
- B. Greatest and Least Precipitation (Inches).
- C. Maximum 24-Hour Precipitation (Inches).
- D. Mean Number of Days with Precipitation > 0.004 inch.
- E. Mean Number of Days with Snowfall.

Table 3. Relative Humidity:

- A. Mean Relative Humidity (%) at Specified Hours.

Table 4. Winds:

- A. Direction, Mean Speed (Knots), and Percentage Frequency of Prevailing Surface Wind, at Specified Hours.

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Baku, USSR ($40^{\circ}23'N$ $49^{\circ}41'E$) is an important petroleum industry center. The city spreads around the shores of a horseshoe-shaped bay on the southern coast of the Apsheron Peninsula. Away from the shore, the slopes of a low-lying plateau create a natural amphitheater surrounding the bay on three sides. The plateau forms the backbone of the Apsheron Peninsula, an eastward extension of the Greater Caucasus, the massive mountain range which has given its name to the region.

Baku has a dry, moderate climate. Precipitation is about 8 inches per year with most falling in the colder months. In the summer the temperatures are in the 80's during the day and in the 70's at night; winters are cold with highs in the 40's and lows in the 30's. Evaporation rates greatly exceed the scanty rainfall. During the summer hot, dry winds from the north and northwest sweep around the eastern end of the Greater Caucasus mountain range, and carry dust across the city from the steppes to the north. The slopes of the Apsheron Peninsula are treeless and barren. There is little greenery, although the municipal authorities permit diversion of some water to sustain trees and shrubbery in parks and along avenues. The gardens, orchards, and vineyards surrounding the city are irrigated from deep wells. The nearest forested area is more than 40 miles to the northwest on the slopes of the Greater Caucasus. (See Appendix B, Tables 5 through 8 for detailed climatic data.)

Copies of the following maps are enclosed with this report:

- 3 sheets of the U.S. Army Map Service's topographic series K502 at 1: 250,000, dated 1961. (2 copies each)
- 1 sheet of the ACIC's ONC series at 1:1,000,000, dated 1968. (1 copy)
- 1 sheet of Bartholomew's Middle East at 1:1,000,000, dated 1970. (1 copy)
- 6 sheets of the Iranian National Cartographic Centre's Forestry series at 1:50,000, dated 1963. (1 copy each)

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APPENDIX B

Detailed Climatic Tables for Baku, USSR

Table 5. Temperature:

- A. Mean Daily Temperature ($^{\circ}$ F) at 1300 LST.
- B. Mean Daily Minimum Temperature ($^{\circ}$ F).
- C. Absolute Maximum Temperature ($^{\circ}$ F).
- D. Absolute Minimum Temperature ($^{\circ}$ F).

Table 6. Precipitation:

- A. Mean Precipitation (Inches).
- B. Maximum 24-hour Precipitation (Inches).
- C. Greatest and Least Monthly and Annual Precipitation (Inches).
- D. Mean Number of Days with Precipitation ≥ 0.004 Inches.
- E. Mean Number of Days with Snowfall.

Table 7. Relative Humidity:

- A. Mean Relative Humidity (%) at Specified Hours.

Table 8. Winds:

- A. Frequency of Winds (%) and Maximum Wind Speeds (Knots) by Directions.

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Appendix A.

Table 1A.

Mean Daily Minimum Temperature (°F)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr. Ave.
Babol Sar	39	41	44	51	60	68	73	72	67	58	47	41	55
Gorgan	40	40	43	51	60	68	72	72	67	57	46	41	55

Table 1B.

Mean Daily Maximum Temperature (°F)

Babol Sar	53	54	55	63	75	82	86	86	81	72	65	56	69
Gorgan	56	58	62	69	82	90	91	91	86	77	66	59	74

Table 1C

Absolute Minimum Temperature (°F)

Babol Sar	19	22	32	32	46	50	61	60	50	38	18	16	16
Gorgan	16	27	27	28	43	55	65	65	48	41	28	19	16

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Appendix A.

Table 2A. Mean Precipitation (Inches)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Babol Sar	3.7	2.4	2.5	1.5	0.6	1.1	1.2	2.0	2.6	5.9	4.2	3.9	31.6
Gorgan	2.0	2.1	4.2	2.8	2.0	1.3	1.5	0.9	1.4	4.0	3.5	2.1	23.5

Table 2B. Greatest and Least Precipitation (Inches)

Station	Greatest		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
	Least	Greatest													
Babol Sar	Greatest	9.5	5.3	4.7	2.7	1.6	4.0	4.6	5.2	6.9	10.3	7.4	9.6	36.5	36.5
	Least	0.4	0.8	1.2	0.4	T*	T*	0.2	0.4	0.7	1.3	1.6	0.2	23.4	
Gorgan	Greatest	3.7	5.7	7.3	5.6	4.2	4.5	5.4	1.6	2.4	10.3	6.5	5.4	53.8	53.8
	Least	0.6	1.0	3.1	1.5	0.4	T*	0.5	0.4	0.6	0.7	1.5	0.5	20.0	

Table 2C. Maximum 24-Hour Precipitation (Inches)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Babol Sar	1.9	1.4	1.4	1.6	1.2	1.9	1.7	2.1	4.1	3.8	5.4	2.2	5.4
Gorgan	3.0	1.3	1.4	1.1	2.9	1.7	1.6	0.9	1.6	3.1	2.7	1.5	3.1

*T=Trace

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Appendix A.

Table 3A
Mean Relative Humidity (%) at Specified Hours

Station	Hour (LST)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Babol Sar	0700	94	93	93	93	92	88	87	91	92	95	96	94	92
	1300	74	73	73	75	67	65	66	66	66	66	74	74	70
	1600	74	73	77	74	70	63	67	67	67	75	74	77	72
Gorgan	0700	81	79	84	81	79	75	73	78	77	81	81	79	79
	1300	66	62	66	64	54	50	54	55	54	57	59	62	59

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Appendix A.

Table 2D. Mean Number of Days with Precipitation > 0.004 Inches

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Babol Sar	10	9	8	7	4	6	4	6	6	10	3	7	87

Table 2E. Mean Number of Days with Snowfall

Babol Sar	T*	1	T*	0	0	0	0	0	0	0	0	T*	1
Gorgan	1	1	1	0	0	0	0	0	0	0	0	1	4

*T-- Trace

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Appendix A.

Table 1D. Mean Number of Days with Minimum Temperature 32°F or Lower

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr. Total
Babol Sar	3	5	0	P*	0	0	0	0	0	0	1	5	15

Table 1E. Absolute Maximum Temperature (°F)

Babol Sar	82	78	88	88	93	91	95	95	95	90	81	81	95
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*P -- Partial

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Appendix A.

Table 4A.

Direction, Mean Speed (Knots), and Percentage Frequency of Prevailing Surface Wind, at Specified Hours. (Prevailing wind is wind that occurs most often. Calm indicates wind speed < 1 knot.)

Station	Hour (LST)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Babol SAR	0700	S/3 29	Calm 57	Calm 50	Calm 54	Calm 47	Calm 52	Calm 51	Calm 43	Calm 53	Calm 49	Calm 54	Calm 49
	1600	NE/4 30	NE/5 34	NE/5 56	NE/6 26	NW/5 29	NW/6 35	NW/6 37	NW/6 36	N/5 27	NE/5 35	NE/5 29	NE/4 19

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Appendix B.

Table 5A. Mean Daily Temperature (°F) at 1500 LST

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Baku	41	42	46	54	67	77	82	82	74	66	53	46	61

Table 5B. Mean Daily Minimum Temperature (°F)

Baku	34	36	39	46	56	66	72	72	66	58	46	40	52
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Table 5C. Absolute Maximum Temperature (°F)*

Baku	65	71	77	85	92	97	99	99	91	83	80	70	99
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Table 5D. Absolute Minimum Temperature (°F)

Baku	8	16	17	29	44	47	57	57	45	32	21	16	8
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*Data taken at 0700, 1300, 2100 LST.

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Appendix B:

Table 6A.

Mean Precipitation (Inches)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Baku	1.0	0.6	0.8	0.8	0.5	0.3	0.2	0.5	0.6	0.9	1.1	0.9	8.1

Table 6B.

Maximum 24-hour Precipitation (Inches)

Baku	1.0	0.7	1.0	0.9	0.6	0.4	0.5	0.6	0.7	1.2	0.7	1.0	1.2
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Table 6C. Greatest and Least Monthly and Annual Precipitation (Inches)

Baku	G	3.1	1.3	2.6	2.8	1.1	1.0	0.7	0.8	2.0	2.2	2.5	2.2	11.5
	L	T*	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	T*	0.0	0.1	4.7

Table 6D.

Mean Number of Days with Precipitation ≥ 0.004 Inches

Baku	9	8	6	5	4	3	2	2	4	6	7	8	64
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Table 6E.

Mean Number of Days with Snowfall

Baku	4	4	2	T*	0	0	0	0	0	0	T*	2	11
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* T -- Trace

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Appendix B.

Table 8A. Frequency of Winds (%) and Maximum Wind Speeds (Knots) by Directions

January

Station	Wind Speeds (Knots):	N	NE	E	SE	S	SW	W	NW	Calm	Totals
Baku	2 -- 10	10	2	2	5	9	6	2	8	3	52
	11 -- 20	12	1	0	1	5	5	1	7		53
	21 -- 29	5	0	0	0	1	2	0	2		10
	> 29	4	--	--	--	0	0	--	1		5
	Total	31	3	2	6	15	14	5	18	3	100
	Maximum	40	14	15	14	13	18	12	23		

February

Baku	2 -- 10	11	2	2	7	8	5	2	9	4	50
	11 -- 20	14	1	0	2	7	4	0	6		54
	21 -- 29	6	--	--	--	2	1	--	2		11
	> 29	4	0	--	--	0	0	--	1		5
	Total	55	5	2	9	17	10	2	18	4	100
	Maximum	24	16	7	10	20	18	10	24		

March

Baku	2 -- 10	10	2	1	6	8	4	2	7	5	45
	11 -- 20	15	1	1	2	10	5	0	4		55
	21 -- 29	6	0	--	0	5	1	--	1		11
	> 29	6	--	--	0	1	0	--	1		3
	Total	37	5	2	8	22	5	2	15	5	100
	Maximum	22	16	16	16	16	16	10	24		

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April

Station	Wind Speeds (Knots)	N	NE	E	SE	S	SW	W	NW	Calm	Totals
Baku	2 -- 10	9	1	1	8	11	5	1	6	7	47
	11 -- 20	15	1	0	4	12	5	1	5	3	39
	21 -- 29	4	--	--	0	2	1	0	1		3
	> 29	5	--	--	--	0	0	--	1		5
	Total	51	2	1	12	25	7	2	13	7	100
	Maximum	54	10	6	14	16	13	12	20		

May

Baku	2 -- 10	9	2	1	8	10	4	1	7	7	49
	11 -- 20	15	0	0	5	11	1	1	7	7	58
	21 -- 29	7	0	--	0	0	0	0	1		8
	> 29	4	--	--	--	0	--	0	1		5
	Total	35	2	1	11	21	5	2	15	7	100
	Maximum	28	12	6	12	16	12	13	20		

June

Baku	2 -- 10	9	2	1	10	10	5	2	7	6	50
	11 -- 20	17	1	0	2	6	1	1	6	6	54
	21 -- 29	8	0	--	0	0	--	0	2		12
	> 29	5	--	--	--	0	--	--	1		6
	Total	59	3	1	12	16	4	5	16	6	100
	Maximum	34	14	9	12	16	7	12	20		

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Appendix B.

Table 7A.

Mean Relative Humidity (%) at Specified Hours

	Hours (LST)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
Baku	0700	87	87	86	79	71	66	65	70	75	84	87	86	79
	1300	77	75	72	68	63	59	57	60	65	72	77	78	69
	2100	86	87	86	82	78	73	71	74	77	84	87	86	81

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October

Station	Wind Speeds (Knots)	N	NE	E	SE	S	SW	W	NW	Calm	Totals
Baku	2 -- 10	12	3	2	8	10	5	2	9	4	55
	11 -- 20	11	1	1	5	8	2	0	4	1	39
	21 -- 29	6	0	0	0	1	1	0	1	1	9
	> 29	4	--	--	--	1	3	0	1	1	2
	Total	55	4	5	11	23	3	0	1	1	9
	Maximum	28	12	12	12	16	16	16	15	4	100

November

Baku	2 -- 10	15	3	4	7	10	5	2	8	5	57
	11 -- 20	12	1	1	5	7	2	0	6	1	32
	21 -- 29	4	--	--	--	1	1	0	1	1	7
	> 29	5	0	--	--	--	0	--	1	1	4
	Total	52	4	5	10	18	3	2	1	1	4
	Maximum	28	8	3	10	14	16	12	15	5	100

December

Baku	2 -- 10	12	4	5	5	9	6	5	11	7	56
	11 -- 20	19	1	1	1	5	4	1	5	1	28
	21 -- 29	4	--	--	--	1	2	0	1	1	3
	> 29	5	--	--	--	0	9	--	1	1	4
	Total	29	5	4	6	15	12	4	18	7	100
	Maximum	28	10	10	10	16	18	14	18	7	

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July

Station	Winds Speeds (Knots)	July										Calm	Totals
		N	NE	E	SE	S	SW	W	NW				
Baku	2 -- 10	9	2	1	9	6	2	2	5	7	43		
	11 -- 20	22	2	0	3	4	0	0	5	5	57		
	21 -- 29	10	0	--	--	--	--	--	2		12		
	> 29	7	--	--	--	--	--	--	1		12		
	Total	48	4	1	12	10	2	2	14		8		
	Maximum	34	12	7	9	10	8	9	29	7	100		

August

Station	Winds Speeds (Knots)	August										Calm	Totals
		N	NE	E	SE	S	SW	W	NW				
Baku	2 -- 10	11	3	1	10	6	2	2	6	6	6	47	
	11 -- 20	21	2	1	5	4	0	0	5	5	56		
	21 -- 29	9	0	--	--	--	--	--	2		11		
	> 29	5	--	--	--	--	--	--	1		11		
	Total	46	5	2	13	10	2	2	14		6	6	
	Maximum	24	14	7	10	10	8	9	20	6	100		

September

Station	Winds Speeds (Knots)	September										Calm	Totals
		N	NE	E	SE	S	SW	W	NW				
Baku	2 -- 10	11	3	2	10	9	2	2	3	6	6	55	
	11 -- 20	15	1	1	4	6	1	0	4	52		52	
	21 -- 29	3	0	--	--	0	0	--	2			10	
	> 29	4	0	--	--	--	--	--	1			5	
	Total	56	4	5	14	15	3	2	15		6	6	
	Maximum	24	18	9	10	14	14	10	23	6	100		

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